Template Week 2 – Logic

Student number: 568403 (Kiarash Delavar)

Assignment 2.1: Parking lot

Which gates do you need?

+ I need **AND gate** to solve this problem.

Complete this table:

Parking lot 1	Parking lot 2	Parking lot 3	Result (full)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

Assignment 2.2: Android/iPhone

Which gates do you need?

+ I need **XOR gate** for that **(Exclusive OR Gate).**

Complete this table:

Android phone	iPhone	Result (Phone in possession)
0	0	0
0	1	1
1	0	1
1	1	0

Assignment 2.3: Four NAND gates

Complete this table:

A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

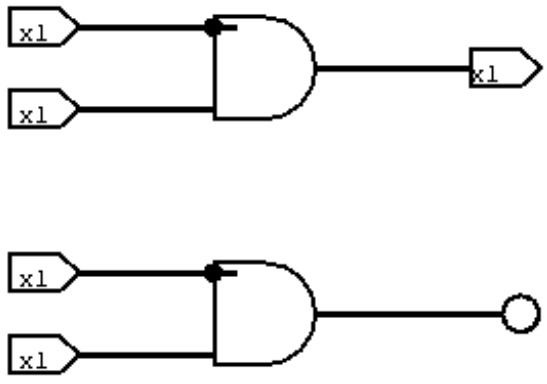
How can the design be simplified?

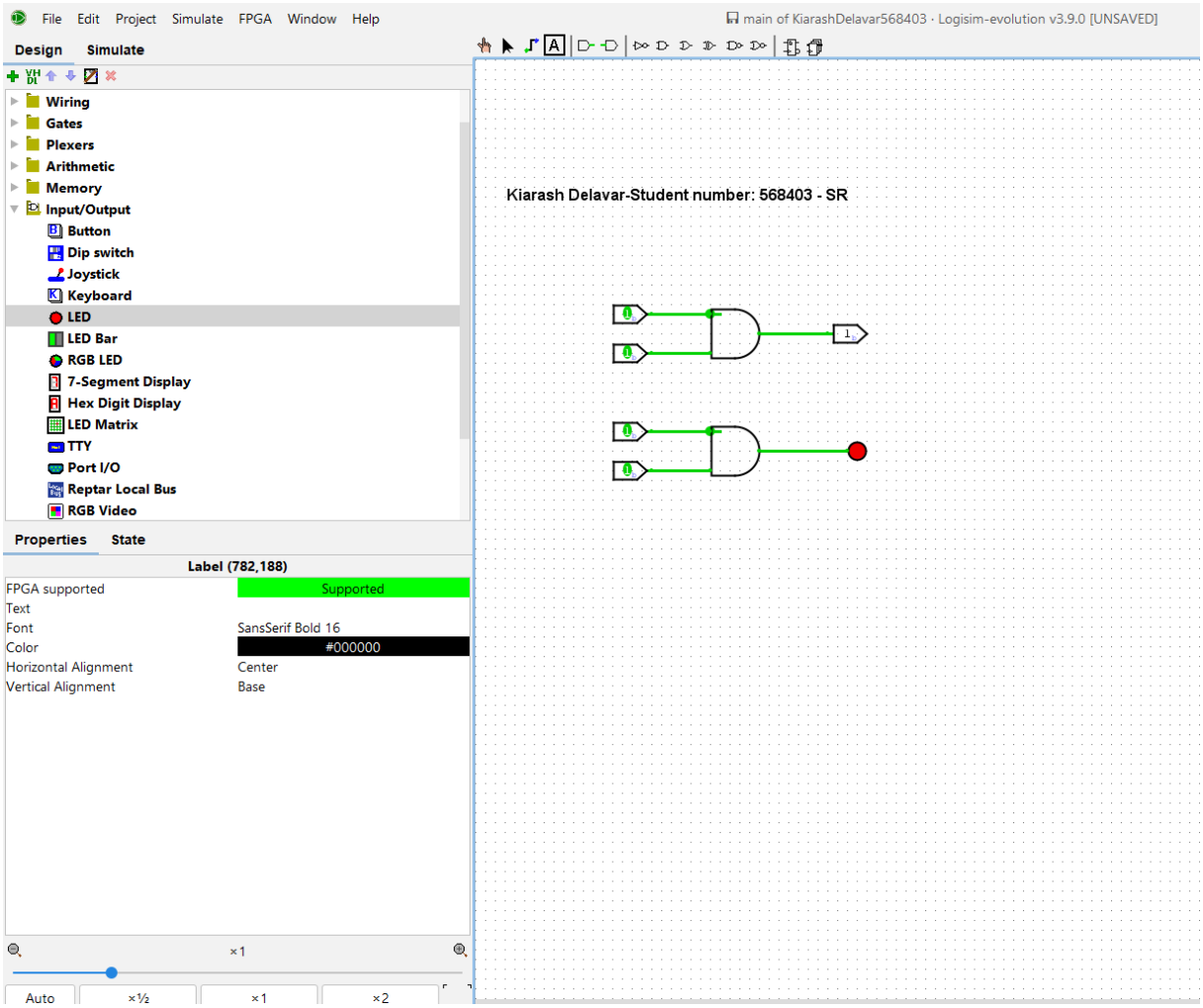
The logic of the circuit forms NAND gate functionality this can be simplified into just one NAND gate instead of using multiple NAND gates in design.

Assignment 2.4: Getting to know Logisim evolution

Screenshot of the design with your name and student number in it:

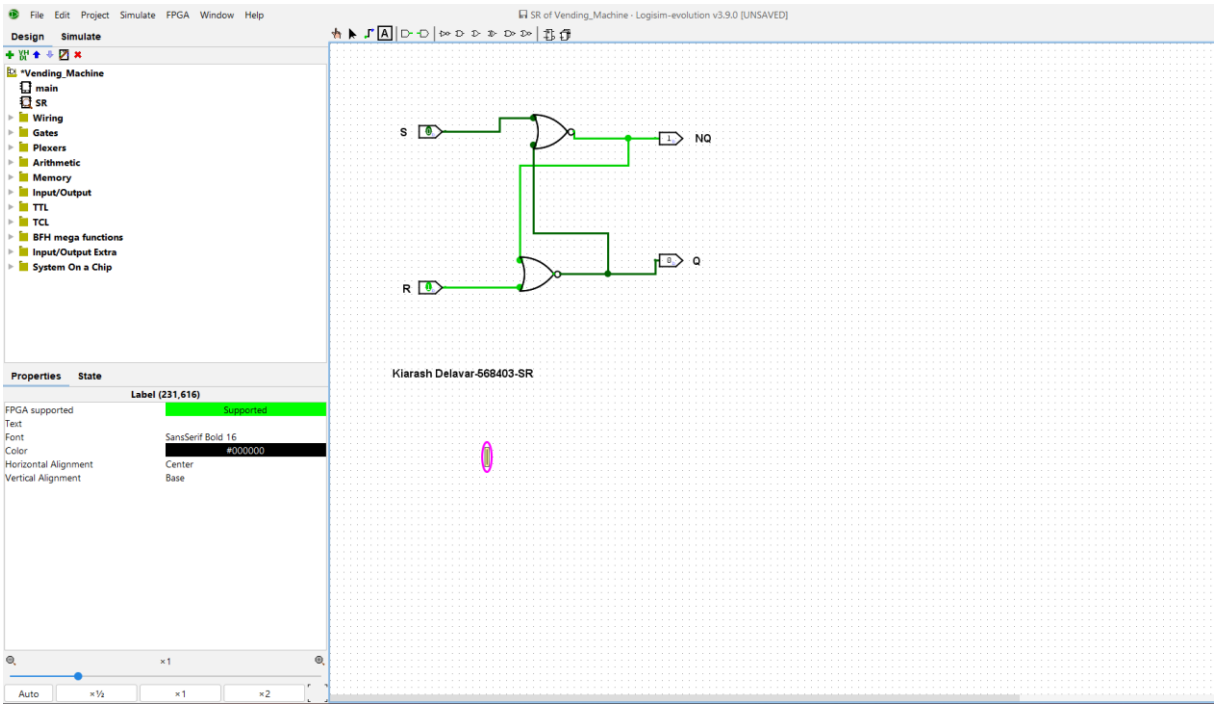
Kiarash Delavar-Student number: 568403 - SR

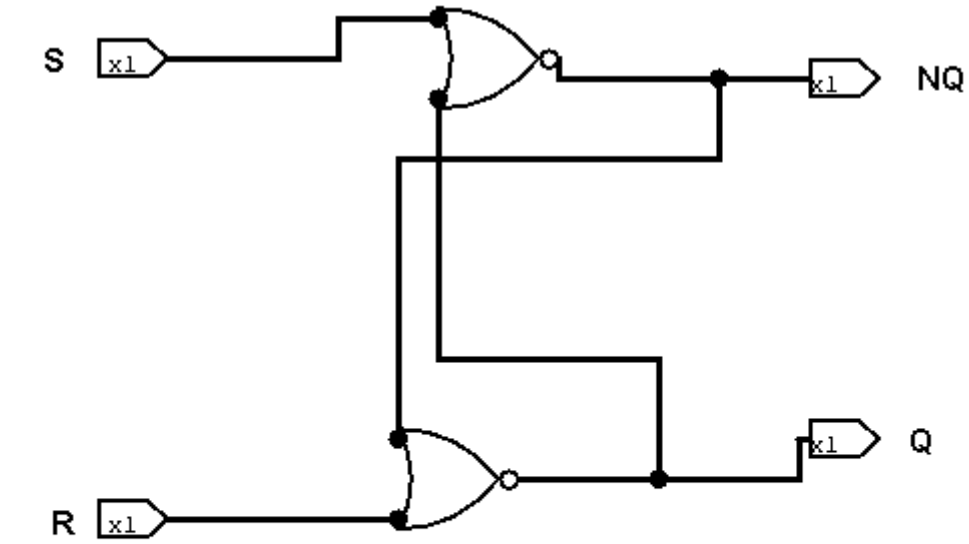



File Edit Project Simulate FPGA Window Help
main of KiarashDelavar568403 · Logisim-evolution v3.9.0 [UNSAVED]
Design Simulate
Wiring
Gates
Plexers
Arithmetic
Memory
Input/Output
Button
Dip switch
Joystick
Keyboard
LED
LED Bar
RGB LED
7-Segment Display
Hex Digit Display
LED Matrix
TTY
Port I/O
Reptar Local Bus
RGB Video
Properties State
Label (782,188)
FPGA supported Supported
Text
Font SansSerif Bold 16
Color #000000
Horizontal Alignment Center
Vertical Alignment Base
×1
Auto ×½ ×1 ×2
Kiarash Delavar-Student number: 568403 - SR

Assignment 2.5: SR Latch

Screenshot SR Latch in Logisim with your name and student number:





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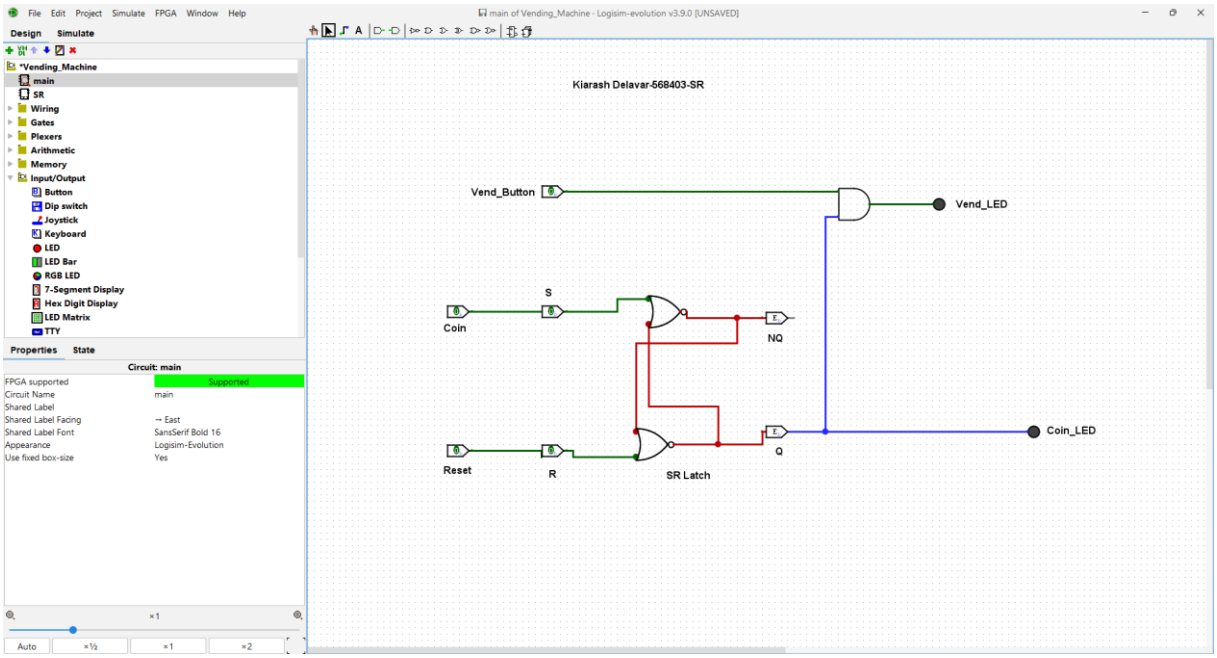
Assignment 2.6: Vending Machine

Screenshot Vending Machine in Logisim with your name and student number:



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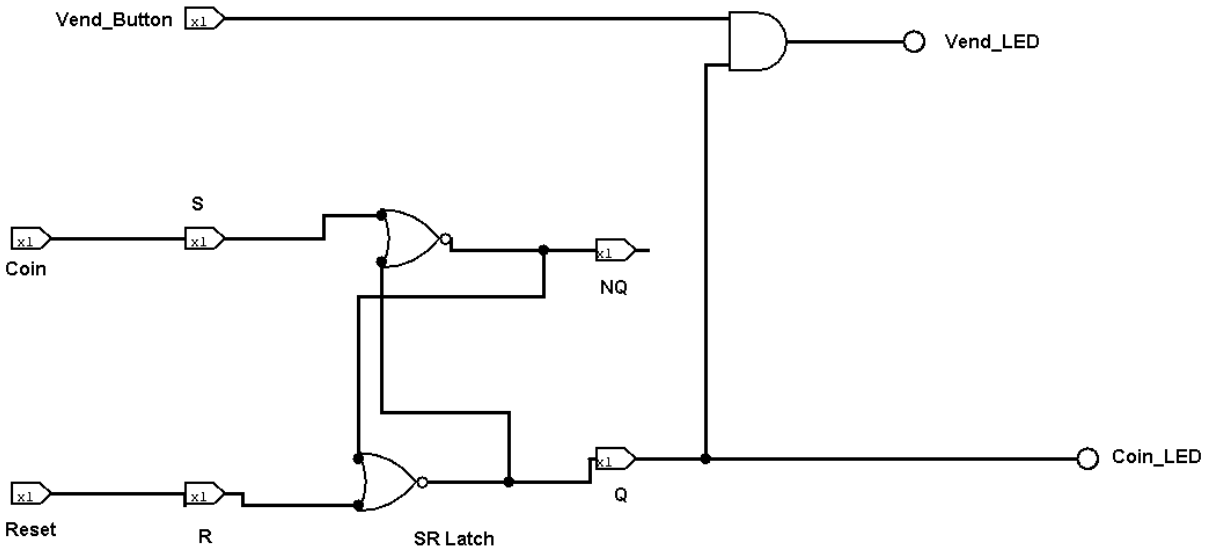


Bonus point assignment – week 2

Create a java program that accepts user input and presents a menu with options.

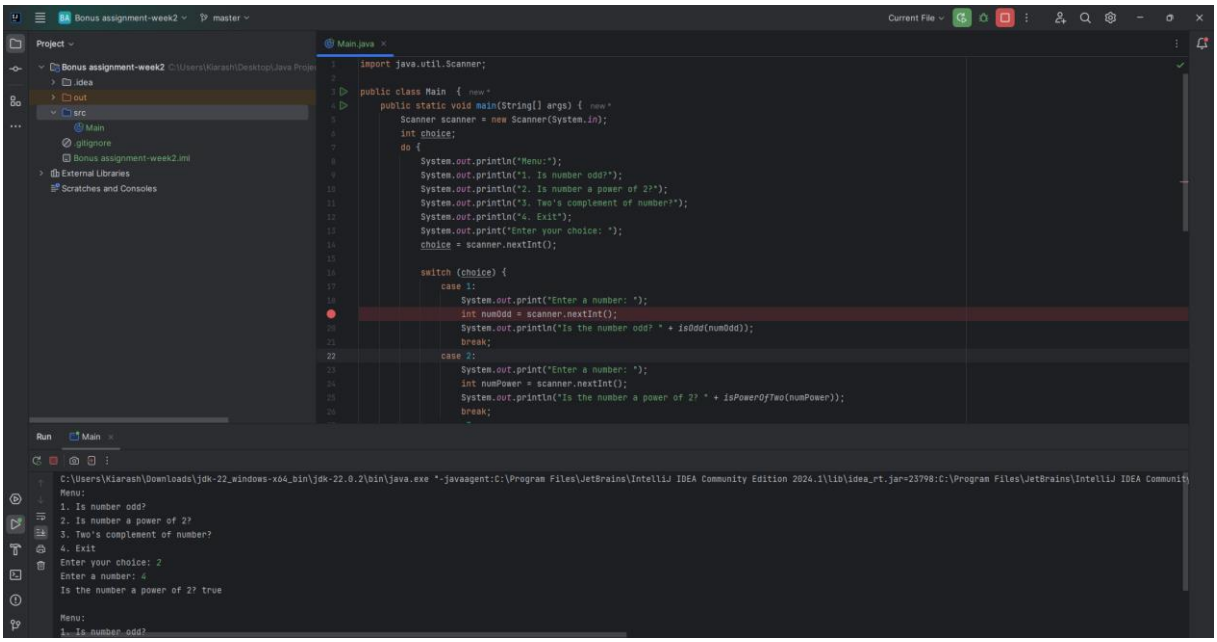
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?

Implement the methods by using the bitwise operators you have just learned.

Organize your source code in a readable manner with the use of control flow and methods.

Paste source code here, with a screenshot of a working application.

Screenshot of a working application:



twosComplement(numTwosComplement));

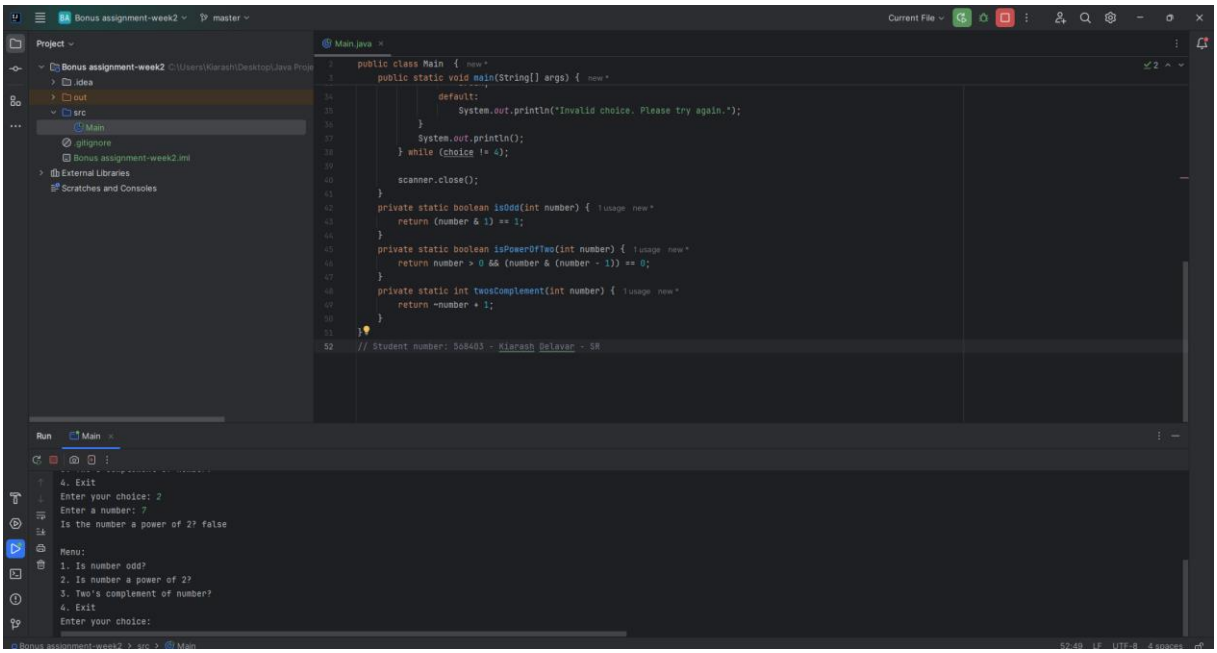
SOURCE CODE IS HERE:

```
import java.util.Scanner;

public class Main  {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      int choice;
      do {
         System.out.println("Menu:");
         System.out.println("1. Is number odd?");
         System.out.println("2. Is number a power of 2?");
```

```
            System.out.println("3. Two's complement of number?");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");
            choice = scanner.nextInt();

            switch (choice) {
                case 1:
                    System.out.print("Enter a number: ");
                    int numOdd = scanner.nextInt();
                    System.out.println("Is the number odd? " + isOdd(numOdd));
                    break;
                case 2:
                    System.out.print("Enter a number: ");
                    int numPower = scanner.nextInt();
                    System.out.println("Is the number a power of 2? " + isPowerOfTwo(numPower));
                    break;


                case 3:
                    System.out.print("Enter a number: ");
                    int numTwosComplement = scanner.nextInt();
                    System.out.println("Two's complement of the number: " +
twosComplement(numTwosComplement));
                    break;
                case 4:
                    System.out.println("Exiting...");
                    break;
                default:
                    System.out.println("Invalid choice. Please try again.");
            }
            System.out.println();
        } while (choice != 4);

        scanner.close();
    }
    private static boolean isOdd(int number) {
        return (number & 1) == 1;
    }
    private static boolean isPowerOfTwo(int number) {
        return number > 0 && (number & (number - 1)) == 0;
    }
    private static int twosComplement(int number) {
        return ~number + 1;
    }
}
```

Please Look at the next page:

My Student number in the end line:



Ready? Then save this file and export it as a pdf file with the name: **week2.pdf**